

REMARKS

This is a full and timely response to the non-final Office Action mailed March 29, 2006 (Paper No. 20060220). Reconsideration and allowance of the Application and presently pending claims are respectfully requested.

I. Indication of Allowed Claim

Applicants greatly appreciate the Examiner's statement in this Office Action in which claim 17 has been allowed.

II. Rejection under 35 U.S.C. §112, first paragraph

Claims 1-16 and 18-23 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 1 and 15 allegedly contain new matter. Claims 24-27 stand rejected under 35 U.S. § 112, first paragraph, as failing to comply with the enablement requirement. Applicants have amended the claims and believe that the claims are in condition to overcome the rejection.

III. Rejection under 35 U.S.C. §103(a)

Claims 1, 2, 4-6, 8, 9, 11, 15, 16, and 20-23 stand rejected as allegedly being unpatentable in view of *Sidey*. Claims 3, 13, and 14 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Kram* in view of *Sidey* as applied to claim 1, and further in view of *Cooper, et al.* Claim 24 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kram* in view of *Sidey*.

In order for a claim to be properly rejected under 35 U.S.C. §103, the teachings of the prior art reference must suggest all features of the claimed invention to one of ordinary skill in the art. See, e.g., *In re Dow Chemical*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981).

A. Claim 1

Claim 1, as amended, recites:

An apparatus for determining *in situ* pore fluid and soil properties, the apparatus comprising:
a penetrating tip member configured to penetrate the soil;
and

an attachment module coupled to the penetrating tip member, the attachment module including at least one mandrel, each mandrel including at least one piezo sensor and a friction sleeve,

wherein each piezo sensor is capable of obtaining an *in situ* measurement of pore pressure at a location corresponding proximal to the at least one mandrel on the attachment module, *each friction sleeve of the respective mandrel having surface texture of a particular roughness that is capable of inducing an internal shearing of the soil, each piezo sensor of the respective mandrel being capable of measuring in situ pore fluid pressure from the induced shearing of the soil generated by the friction sleeve of the respective mandrel.*

(Emphasis Added)

- i. *Kram fails to disclose and teach the feature of "each mandrel including at least one piezo sensor and a friction sleeve, ... each friction sleeve of the respective mandrel having surface texture of a particular roughness that is capable of inducing an internal shearing of the soil, each piezo sensor of the respective mandrel being capable of measuring in situ pore fluid pressure from the induced shearing of the soil generated by the friction sleeve of the respective mandrel," as recited in claim 1.*

In fact, *Kram* discloses that the "pore water pressure is measured by a porous element or filter 28 mounted in conical tip 24 of piezocone 20 and a pressure transducer 30 mounted in cylindrical friction sleeve 22 of piezocone 20." (*Kram*, col. 4, lines 8-11, emphasis added). In short, the *Kram* penetrometer appears to disclose that the conical tip of the piezocone contains sensors that are involved in calculating the pore water pressure. Consequently, Applicants respectfully submit that *Kram* fails to teach, disclose or suggest the feature of "each mandrel including at least one piezo sensor and a friction sleeve, ... each friction sleeve of the respective mandrel having surface texture of a particular

roughness that is capable of inducing an internal shearing of the soil, each piezo sensor of the respective mandrel being capable of measuring in situ pore fluid pressure from the induced shearing of the soil generated by the friction sleeve of the respective mandrel", as recited in amended claim 1. Accordingly, Applicants respectfully submit that the rejection be withdrawn and claim 1 be allowed.

- ii. Sidey fails to disclose and teach the feature of "at least one piezo sensor being positioned entirely within each mandrel, ... each piezo sensor is capable of obtaining an in situ measurement of pore pressure from only the piezo sensor output," as recited in claim 1

In fact, *Sidey* appears to disclose the following:

With the secondary probe member 18 in its retracted position as seen in FIG. 2, its extension rod 60 extends above the rear or inner flat end 40 of the major cone 34 into the pressure chamber 38. An O-ring seal 76 mounted within an annular groove 78 on the inner tip section 64 of the instrumented tip 58 adjacent the lower end 66 of the extension rod 60 maintains an effective seal between the major cone 34 and the instrumented tip 58 during its movement from the retracted (FIG. 2) to extended (FIG. 3) positions.

(*Sidey*, col. 5, lines 10-19).

In short, the *Sidey* penetrometer appears to disclose that the outer tip end 16 of the probe member contains a piezo sensor that is involved in calculating the pore water pressure. The *Sidey* secondary probe member 18 extends from the tip 16 of the primary probe member 14 to sense pore water pressure. The secondary probe member as shown in Fig. 5 of *Sidey* includes a pressure sensor 20 enclosed within an inner tip section 64 and outer tip section 62.

Consequently, Applicants respectfully submit that *Sidey* fails to teach, disclose or suggest the feature of "each mandrel including at least one piezo sensor and a friction sleeve, ... each friction sleeve of the respective mandrel having surface texture of a particular roughness that is capable of inducing an internal shearing of the soil, each piezo sensor of the respective mandrel being capable of measuring in situ pore fluid pressure from the induced shearing of the soil generated by the friction sleeve of the

respective mandrel", as recited in amended claim 1. Accordingly, Applicants respectfully submit that the rejection be withdrawn and claim 1 be allowed.

- iii. The combination of *Kram* and *Sidey* fails to disclose, teach or suggest each and every element of claim 1

Because *Kram* and *Sidey* fail to disclose, teach, or suggest the above-emphasized features of claim 1, Applicants respectfully submit that the combination of *Kram* and *Sidey* also fails to disclose, teach, or suggest each and every element of claim 1. Thus, a *prima facie* case of obviousness is not established based on *Kram* and *Sidey*. Consequently, for at least this reason, among others, Applicants respectfully request that claim 1 be allowed and the rejection be withdrawn.

B. Claims 15 and 24

Claim 15, as amended, recites:

A method of determining *in situ* pore fluid and soil properties, the method comprising the steps of:
positioning a penetrating tip member so as to penetrate into the soil at a particular subsurface area;
positioning an attachment module in a predetermined relationship to the penetrating tip member to form a penetrometer;
forcing the penetrometer into the soil beginning with the penetrating tip member;
collecting attachment module measurements from at least one piezo sensor coupled to at least one mandrel, ***each mandrel including at least one piezo sensor and a friction sleeve***; and
obtaining an *in situ* measurement of pore fluid pressure at a depth that corresponds to the location of the at least one mandrel from the at least one piezo sensor, ***each friction sleeve of the respective mandrel having a surface texture of a particular roughness that is capable of inducing an internal shearing of the soil, each piezo sensor of the respective mandrel being capable of measuring in situ pore fluid pressure from the induced shearing of the soil generated by the friction sleeve of the respective mandrel.***

(Emphasis Added)

Claim 24, as amended, recites:

An apparatus for determining *in situ* pore fluid and soil properties, the apparatus comprising:
a penetrating tip member configured to penetrate the soil;
and

an attachment module coupled to the penetrating tip member, the attachment module including at least one mandrel, each mandrel including at least one piezo sensor and a friction sleeve, each friction sleeve of the respective mandrel having surface texture of a particular roughness that is capable of inducing an internal shearing of the soil, each piezo sensor of the respective mandrel being capable of measuring in situ pore fluid pressure from the induced shearing of the soil generated by the friction sleeve of the respective mandrel.

(Emphasis Added)

As mentioned above, the Kram penetrometer appears to disclose that the conical tip of the piezocone contains sensors that are involved in calculating the pore water pressure. The Sidey penetrometer appears to disclose that the outer tip end 16 of the probe member contains a piezo sensor that is involved in calculating the pore water pressure. The Sidey secondary probe member 18 extends from the tip 16 of the primary probe member 14 to sense pore water pressure. The secondary probe member as shown in Fig. 5 of Sidey includes a pressure sensor 20 enclosed within an inner tip section 64 and outer tip section 62. Consequently, Applicants respectfully submit that Kram and Sidey fail to disclose, teach or suggest the above-emphasized feature of claims 15 and 24.

Because Kram and Sidey fail to disclose, teach, or suggest the above-emphasized features of claims 15 and 24. Applicants respectfully submit that the combination of Kram and Sidey also fails to disclose, teach, or suggest each and every element of claims 15 and 24. Thus, a *prima facie* case of obviousness is not established based on Kram and Sidey. Consequently, for at least this reason, among others, Applicants respectfully request that claims 15 and 24 be allowed and the rejection be withdrawn.

C. Dependent Claims

Because independent claims 1, 15 and 24 are allowable over the cited art of record, dependent claims 2-14, 16, 18-23 and 25-27 are allowable as a matter of law for at

least the reason that dependent claims 2-14, 16, 18-23 and 25-27 contain all features and elements of their respective independent base claims. *See, e.g., In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Accordingly, the rejection to dependent claims 2-14, 16, 18-23 and 25-27 should be withdrawn for at least this reason, among others.

CONCLUSION

The Applicants respectfully submit that all claims are now in condition for allowance, and request that the Examiner passes this case to issuance. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

No fee is believed to be due in connection with this response. If, however, any fee is deemed to be payable, you are hereby authorized to charge any such fee to Deposit Account No. 20-0778.

Respectfully submitted,



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